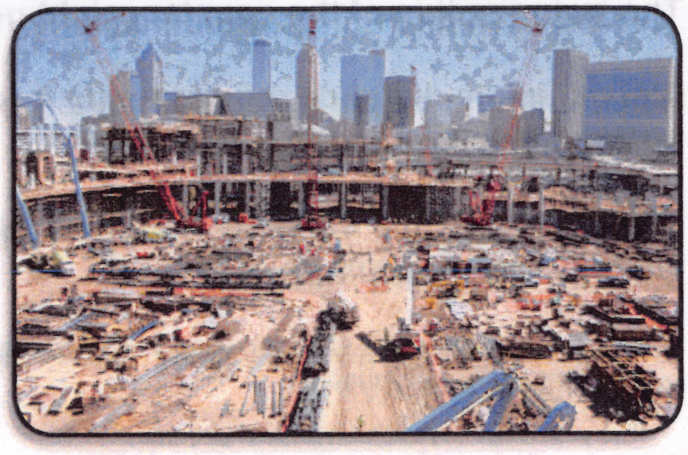
# Module 14
# Site Preparation



## Learning Objectives

By the end of this section, you will:

1. Know and understand the site requirements for crane operations.
2. List factors to consider when checking ground conditions and what situations to avoid.

## Site Requirements

**Adequate space to erect, extend and swing the boom must be provided.**

**There must be adequate room for the safe movement of the crane and the boom assembly.**

OSHA®
1926.1424
1926.1408

Barricades are required by regulations to block access to the swing area of the crane superstructure because personnel can be struck or crushed easily in this area. All work sites must be inspected for possible power line interference. A crane should never be positioned to allow operations within encroachment distances. If possible the power should be interrupted during craning operations. A signal person, with a radio or a load warning device, should always be used when working near power lines.

**Barrier or fence must be placed around any crane in operation.**

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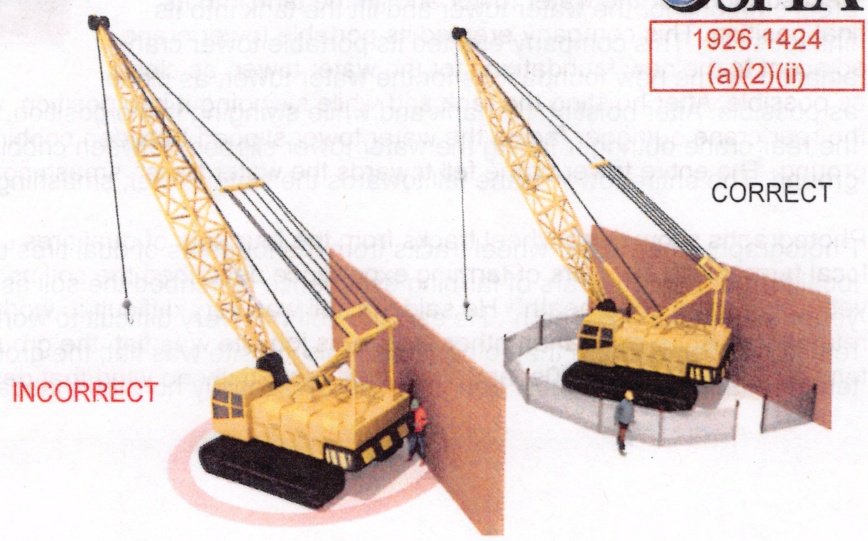
(a)(2)(ii)

The crane should have a minimum 360° 2 foot clearance around its swing radius. Non-involved personnel are not allowed in the swing radius of the crane.



**The swing radius of the counterweight must be roped or barricaded.**

**The minimum distance requirements from power lines and other obstacles must be maintained.**

OSHA 1926.1407 - 1926.1411

**When working in a building operators must consider the stability of the structure.**

The flooring and the entire structure should be adequately supported and certified to handle the load weight (crane and maximum lift).

## Ensuring Ground Stability

**A crane is only as stable as the ground on which it sits.**

OSHA 1926.1402

Ground stability is a critical factor in safe crane operations and one of the leading causes of crane incidents. When creating a load chart, manufacturers assume the crane will be operating on firm, level ground. The ground or structure under the crane must be able to support the crane and its load. Ground supporting outriggers must be able to fully support the machine during loaded conditions. This includes the dead weight of all machinery, the load, all rigging, and shock or impact loading.

### Case Study

A 29-year-old worker for a water tank company was killed when the partially assembled water tower he was working on was struck by a falling portable tower crane. The man was part of a three person crew that reconditions and relocates used water towers, this one intended for a small rural Iowa community. An independent crane company was hired to erect supports for the water tower and lift the tank into its final position. This company erected its portable tower crane adjacent to the new foundations for the water tower, as close as possible. After hoisting the tank and while swinging it into position, with just a few feet to go, the rear crane outrigger facing the water tower slipped between cribbing timbers and sank into the ground. The entire tower crane fell towards the water tower, smashing everything in its path.

Photographs show deep wheel tracks from the four sets of dual tires under the heavy trailer. A local farmer with 30 years of farming experience described the soil as “hard as pavement on top, yet pure gumbo underneath”. He said the soil was very difficult to work; it drained poorly, and retained moisture more than other soils. This job site was flat; the ground surface was dry; the temperature was in the 90s, and there was essentially no wind that day.

## *What are the OSHA requirements for "ground condition"?*

EXERCISE OSHA Subpart CC

» Graded.
» Leveled.
» Compacted.
» Firm.
» Drained.

### Ground conditions need to be considered.

Running water

Freezing temperatures

Level ground

Water can have a drastic effect on the ground base that the crane sits on. Flowing or running water may cause erosion that may undermine the support of the crane. Care must be taken when working in temperatures that fluctuate between freezing and thawing because freezing and frost can give false indications of support. The area for crane operations must be perfectly level.

### Cranes should be positioned on stable ground.

They should avoid setting up too close to: slopes, trenches, or uncompacted soil. The weight of the load or the vibration from the work can cause shifting or collapsing of the ground. Loss of ground support can effect the lift as well as damage to the crane or its components. Operators should never assume that the ground can fully support the crane and should know where weak areas could exist. 1926.1402(c)(2)

## *What are some factors that would decrease ground stability?*

OSHA 1926.1402

» Excavation.
» Trenches.
» Shoring.
» Side slopes.
» Ground water.
» Buried utilities and tanks.
» Foundations.

### Locate all utility lines, pipelines and sewers.

## Case Study

In November, 2012, a crane overturned in Newcastle, New Hampshire after an outrigger jack punched through into an underground septic tank while lifting trees from the back yard of a house.

Notes: